

Upper Ocean Measurements from Profiling Floats in the Arabian Sea During NASCar

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Award Number: N00014-15-1-2254
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LONG-TERM GOALS

[top-level goals]

OBJECTIVES

The work proposed here is designed to examine the seasonal evolution of the upper ocean in the northern Arabian Sea over several seasonal cycles, with the specific objectives of

- (1) Documenting the spatial variations in the seasonal cycle of the upper ocean circulation, especially the mixed layer temperature, salinity, and depth, and the distribution of barrier layers;
- (2) Gaining a better understanding of the diurnal cycles of temperature and salinity very near the sea surface; and
- (3) Examining vertical mixing in the upper ocean through an analysis of the dissolved oxygen and other tracer distributions.

APPROACH

Argo floats have been deployed in the world ocean for over 15 years, resulting in a greatly improved view of the ocean circulation at depths above 2000 m; these data are now being synthesized into estimates of flow, transports, and fluxes that were not possible prior to the beginning of the program. At present there are over 100 Argo floats active in the Arabian Sea region, nearly matching the canonical Argo sampling density. However, many of the active floats in the region are employ older technology and are more than 3 years old, and will soon be nearing the end of their lives. Accordingly, it is clear that a program of new Argo float deployments in the Arabian Sea is warranted, and NASCar appears to be an ideal way for this to happen. It is planned to provide up to 25 US Argo floats for deployment in this region, purchased and fabricated from NOAA Argo funds. These floats would all represent the latest technology, equipped with Iridium communications, with projected lifetimes of 6 years or more. The resulting data would be analyzed by the PI in the context of the large and mesoscale circulation of the Arabian Sea and the seasonal and spatial evolution of the surface mixed layer, and would be used in conjunction with HYCOM model predictions for the region. The new float data

would surely help to improve the overall picture of the circulation in the Arabian Sea and would also be assimilated into HYCOM, likely improving model forecasts for this region.

WORK COMPLETED

Funds were received by the PI in mid-August of this year, and thus the work on this project is in a very early phase. More results will surely be available in next year's report.

RESULTS

Funds were received by the PI only about 6 weeks prior to preparing this annual report, so there is very little to report at this time. Within the next year many of the planned float deployments will be carried out in the Arabian Sea in conjunction with other projects planned there, and a much more comprehensive report will be available at the end of FY2016.

IMPACT/APPLICATIONS

The float deployments planned in this project will allow improvements in estimates of the large and mesoscale circulation of the Northwestern Indian Ocean, and will surely also help improve model simulation and prediction of the ocean circulation from the additional data that will be provided. The float data will clearly augment whatever glider data are obtained in NASCar, with the floats best used in sampling the open ocean and the gliders in sampling closer to the boundaries of the domain. The floats can be deployed from any sea-going platform, whether it stops or not (i.e., from container ships or research vessels), or from aircraft. We expect that the data generated from this work will be useful in a number of scientific investigations and to many researchers. The data can be made available in real-time on the internet, as is generally done with Argo-type float data. We have collaborated for many years with colleagues in India and expect their continued help with float deployments in the vicinity of the Indian coastline in the Arabian Sea.

RELATED PROJECTS

The PI is a member of the US Argo Consortium and is a member of the International Argo Steering Team. The floats used in this project will be partially funded by NOAA through US Argo.